

NOVIKOV, I.T.; NEPOROZHNIY, P.S.; GANICHEV, I.A.; LAVRENEKO, K.D.;  
FINOGENOV, Ya.I.; ALEKSANDROV, D.Ya.; SERDYUKOV, N.P.;  
KUDRYAVTSEV, L.N.; PETROV, A.N.; BANNIK, V.P.; VOLKOV, I.M.;  
MEL'NIKOV, B.V.; STAROSTIN, I.A.; BUBNOVSKIY, G.A.; SUVORIN,  
F.Ya.; GRITSAY, B.I.; SKUPKOV, A.A.; BAMSHTEYN, Ye.B.; TURCHIN,  
N.Ya.

IUrii Nikolaevich Pongil'skii; obituary. Energ. stroi.  
no.27:99 '62. (MIRA 15:9)  
(Pongil'skii, IUrii Nikolaevich, 1925-1962)

NOVIKOV, I.T.; NEPOROZHNIY, P.S.; LAVRENEENKO, K.D.; BONDAREV, N.M.;  
PIKOGENOV, Ya.I.; PLATONOV, N.A.; SHIKHAROV, I.S.; BELYANOV,  
A.A.; SEVEST'YANOV, V.I.; ERISTOV, V.S.; ERISTOV, V.S.  
RAZIN, N.V.; MHATSAKANOV, L.N.; PLATONOV, V.A.; SHKUNDIN, B.M.  
SHKUNDIN, B.M.; ROZANOV, K.A.; LIVSHITS, A.Ya.; LOPATIN, N.A.;  
BYSTROV, P.S.

Sergei Borisovich Fogel'son. Gidr. stroi. 31 no. 1:59-60  
Ja '61. (MIRA 14:2)

(Fogel'son, Sergei Borisovich, 1911-1960)

KHEYSIN, Ye.M.; LAVRENEKO, L.Ye.

Duration of bloodsucking and the daily rhythm of feeding and falling-off of females of *Ixodes ricinus* [with English summary in insert]. Zool. zhur. 35 no.3:379-383 Mr '56. (MIRA 9:7)

1. Kafedra zoologii bespozvonochnykh Karelo-Finskogo gosudarstvennogo universiteta.

(Ticks)

PETRENCHUK, O. P.; LAVRENKO, R. F.; DROZDOVA, B. M.; BELASHOVA, M. A.

"On the chemical composition of cloud water."

paper to be presented at Symp on Atmospheric Chemistry, Circulation & Aerosols,  
Visby, Sweden, 18-25 Aug 1965.

Hydrometeorological Service USSR.

LAVRENKO, V.A.; DZYUBENKO, G.M. (Kiyev)

Effect of the magnetic transformations of nickel at the Curie point on the heterogeneous recombination of hydrogen atoms.

Zhur. fiz. khim. 38 no.10:2355-2360 0 '64.

(MIRA 18:2)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.

LAVRENT' V.A.; KHOROSHUN, L.P.; FRANTSEVICH, I.N., akademik

Thermodynamics of heterogeneous catalysis processes. Recombination of gas atoms on solid surfaces. Dokl. AN SSSR 159 no.4: 890-893 D '64 (MIRA 18:1)

1. Institut problem materialovedeniya AN UkrSSR i Institut mekhaniki AN UkrSSR. 2. AN UkrSSR (for Frantsevich).

KHOROSHUN, L.P.; LAVRENKO, V.A.; KARAGYUR, K.N.; FRANTSEVICH, I.N.,  
akademik

Thermodynamics of heterogeneous catalysis; effect of microdis-  
tortions in the crystal lattice of a solid. Dokl. AN SSSR 159  
no.6:1391-1393 D '64 (MIRA 18:1)

1. Institut problem materialovedeniya AN UkrSSR i Institut  
mekhaniki AN UkrSSR. 2. AN UkrSSR (for Frantsevich).

LAVRENKO, V.A.; FRANTSEVICH, I.N.

Heterogenic recombination of atomic gases. Interaction of hydrogen  
atoms with a molybdenum surface. Kosm. issl. 3 no.1:135-141 Ja-F  
'65. (MIRA 18:2)



ROKHILENKO, A.V.; LAVRENKO, V.A.

Method for determining the extent of gas atomization in a flow  
and the catalytic efficiency of metallic surfaces in the recom-  
bination of atoms. Dokl. AN SSSR 160 no.2:398-401 Ja '65.  
(MIRA 18:2)

1. Institut problem materialovedeniya AN SSSR. Submitted July 10,  
1964.

LAVRENEKOVA, A.

Magnetic metals. Znan.sila no.11:1-5 N '53.

(MLRA 6:11)  
(Magnetism)

LAVHRENEKOVA, A.

When thunderstorms occur. Znan.sila no.6:19-22 Je '55. (MIRA 8:8)  
(Thunderstorms)

LAVRENEKOVA, A.

Research and discoveries. Znan.sila 31 no.1:21-24 Ja '56.  
(Nuclear physics) (MLRA 9:4)

LAVRENEKOVA, A.

4-4-7/22

SUBJECT: USSR/Artificial Diamonds

AUTHOR: Lavrenenkova, A.

TITLE: Artificial Diamond (Iskustvennyy almaz)

PERIODICAL: Znaniye - Sila, April 1957, #4, pp 17-19 (USSR)

ABSTRACT: The article gives a short history of the artificial diamonds.

In 1955, the news appeared that the USA, Holland and Sweden have succeeded in producing artificial diamonds. The USA artificial diamond was produced in the laboratory of the General Electric Co. in Schenectady from a solution of carbon in iron under high temperature and pressure. Although 2 years have passed since, the prices of industrial diamonds have not dropped, and the USA still imports industrial diamonds in previous quantities.

The article contains 6 pictures.

ASSOCIATION: -

PRESENTED BY:-

SUBMITTED: -

AVAILABLE: At the Library of Congress.

Card 1/1

LAVRENEV, Boris, laureat Stalinskoy premii.

Sevastopol. Sov.voin 36 no.8:16-18 Ap '54. (MIRA 9:6)  
(Sevastopol--History)

3(5), 15(6)

PHASE I BOOK EXPLOITATION

SOV/1644

Ginzburg, A.I., Ye.A. Nechayeva, Yu.B. Lavrenev, and L.K. Pozharitskaya

Geologiya mestorozhdeniy redkikh elementov. vyp. 1: Redkometal'nyye karbonatity  
(Geology of Rare Element Deposits. no. 1: Rare Metal Carbonatites) Moscow,  
Gosgeoltekhizdat, 1958. 126 p. 5,000 copies printed.

Sponsoring Agency: Vsesoyuznyy nauchno-issledovatel'skiy institut mineral'nogo syr'ya

Eds.: A.I. Ginzburg, and S.V. Ovchinnikova; Tech. Ed.: T.A. Averkiyeva; Editorial  
Board: A.I. Ginzburg (Chairman), I.I. Malyshev, G.G. Rodionov, F.P. Fagutov,  
N.A. Krushchov, Yu.L. Chernosvitov, I.V. Shmanenkoy, V.V. Shcherbina, and M.A. Eygeles.

PURPOSE: This booklet is intended primarily for geologists. It may, however, because  
of its non-technical nature be of interest to the general reader.

COVERAGE: The introductory chapters of this booklet give a short history of the explo-  
ration and study of carbonatites. Approximately half of the contents are devoted  
to a description of the geological and geochemical properties of some rare minerals,  
mainly niobium. These descriptions are aided by the use of tables and charts.  
The second half of the book gives a physical description and the geographical loca-  
tion of some of the well known deposits of the world. There are 131 references of  
which 16 are Soviet.

Card 1/2

Geology of Rare Element Deposits.

SOV/1644

TABLE OF CONTENTS:

From the Editor

Foreword

The Geological, Mineralogical and Geochemical Characteristics of Carbonite Deposits  
(L.K. Pozharitskaya, and A.I. Ginzburg)

A Brief Description of Non-Soviet Carbonatite Deposits

Carbonatite deposits of Europe

Deposits of Alno Island (Ye.A. Nechayeva)

Deposits of the Fen Region (Yu.B. Lavrenov)

Carbonatite deposits of Africa (L.K. Pozharitskaya)

Carbonatite deposits of America (L.K. Pozharitskaya)

Basic Characteristics of the Alkaline Group of Minerals (Ye.A. Nechayeva)

Bibliography (D.B. Yegorov)

AVAILABLE: Library of Congress

Card 2/2

MM/hcr  
5-11-59



LAVRENEV, Yu.B.; EPSHTEYN, Ye.M.

Geology of the massifs of ultrabasic alkali rocks and characteristics  
of their formation. Geol mest. red. elem. no.17:9-27 '62.  
(MIRA 16:10)

(Rocks, igneous)

LAVRENEV, Yu.B.; EPSHTEYN, Ye.M.

Precarbonatite metasomatic processes in ultrabasic alkali massifs.  
Geol. mest. red. elem. no.17:27-37 '62. (MIRA 16:10)

(Carbonatites) (Ultrabasic) (Metasomatism)

PODDUBNAYA, N.A.; LAVRENEVA, G.I. .

Synthesis and properties of peptides containing tertiary nitrogen atoms. Coll Cz Chem 27 no.9:2236-2237 S.'62.

1. Moscow State University, U.S.S.R. (for Poǒdubnaya).

17.1400

29611  
S/120/61/000/004/026/034  
E194/E355

21.6000

AUTHORS: Lavrenikov, V.D. and Rychev, A.S.

TITLE: An audible indicator of the intensity of radioactive radiation

PERIODICAL: Pribery i tekhnika eksperimenta, no. 4, 1961,  
pp. 159 - 160

TEXT: A need was experienced for equipment to give a loud audible warning of radioactive radiation. The instrument that is very briefly described here is connected to the output counter circuit of a radiation counter. The circuit of the instrument is shown schematically in Fig. 2, in which the inscription on the top lefthand side reads 300 V and the remaining inscriptions indicate valve types and resistance values. When an impulse is applied to the input a square wave of 10 milliseconds duration is applied to one of the inputs of a gating circuit which is a normal diode circuit employing a valve type 6X27 (6Kh2P). Signals from a sawtooth oscillator based on a thyatron type T1-4/0.5 (TG1-0.1/0.3) are applied to the other input of the gating circuit. Thus, a single pulse input gives rise to a train

Card 1/2

An audible indicator ....

29614

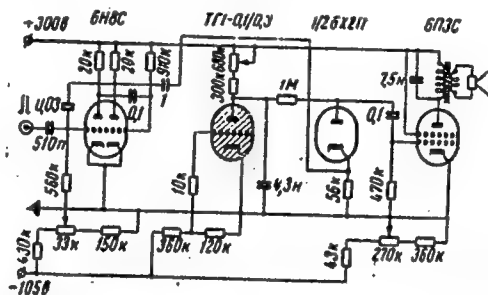
S/120/61/000/004/026/034  
E194/E355

of waves from the sawtooth oscillator. The oscillator frequency can be varied in the range 100 - 1 000 c.p.s. The signal loudness can be controlled by grid control of the valve type 6PZS (6PZS). In the absence of input signals the current consumption is 15 mA, with a supply voltage of +300 V. There are 2 figures.

ASSOCIATION: Institut atomnoy energii AN SSSR  
(Institute of Atomic Energy of the AS USSR)

SUBMITTED: October 26, 1960

Fig. 2:



Card 2/2

9.4120(1163)

33158  
S/120/61/000/006/029/041  
E035/E435AUTHORS: Lavrenikov, V.D., Osochnikov, A.A.TITLE: A simple method for amplitude stabilization of  
trigger circuits

PERIODICAL: Pribery i tekhnika eksperimenta, no.6, 1961, 129-130

TEXT: It is often necessary to obtain trigger voltage pulses of constant amplitude which are independent of supply voltage variations. This is particularly important in the construction of shaping circuits for triggering computer storage systems or ratemeters, the output voltage of which is directly proportional to the amplitude of the shaping voltage pulse. The principle of pure amplitude stabilization described has been used in all trigger circuits, for example in multivibrators, Schmitt triggers, monostable flip-flops, etc. The operation of a circuit suitable for a monostable flip-flop is described. The circuit shown in Fig.1 is a monostable flip-flop with the two cathodes of a twin triode  $\Pi_1$  and  $\Pi_2$  joined together. Positive triggering pulses are fed to  $\Pi_1$ . The sensitivity of the flip-flop is varied by potentiometer  $R_2$ . From the resistance  $R_7$  output pulses are taken and applied to a series limiter, the threshold voltage of Card 1/6

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33158

S/120/61/000/006/029/041  
E035/E435

A simple method for amplitude ...

which is determined by the circuit  $\Pi_3 - R_{10}$ . Basically, the circuit limits the output at the anode of  $\Pi_2$  owing to the use of a series limiter. Possible voltage variations  $U_{a2}$  (Fig.2) caused by heater voltage variation, loss of cathode emission, etc are found to be lower than the limiting threshold  $U_{lim}$  and do not affect the output pulse amplitude  $U_{output}$ . Output pulse amplitude variation are entirely determined by supply voltage variations  $E_a$ . To maintain the output amplitude constant, the lower threshold of the limiter  $U_{lim}$  should be varied in phase and amplitude with voltage variations in  $E_a$ . This is achieved by using a stabilovolt  $\Pi_3$  (a gas discharge tube) through which all voltage variations  $E_a$  are developed across the resistor  $R_{10}$  (since the anode to cathode stabilovolt voltage is constant and equal to the discharge voltage). It is therefore evident that the accuracy to which the output amplitude can be held constant is entirely determined by the stability of breakdown voltage of the stabilovolt. The output pulse amplitude equals the stabilovolt breakdown voltage. In the circuit shown in Fig.1, the stability coefficient of the output pulse amplitudes relative to variations in  $E_a$  is approximately equal to 100.

Card 2/4 3

33158

S/120/61/000/006/029/041

E035/E435

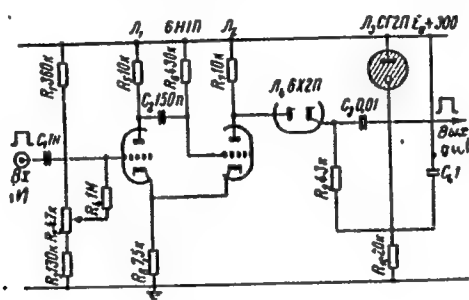
A simple method for amplitude ...

From Fig.2 it is clear that the pulse amplitude will be constant as long as instability factors do not make the magnitude of  $U_{lim} - U_{a2}$  tend to zero. There are 2 figures.

[Abstractor's note: Complete translation.]

SUBMITTED: March 25, 1961

Fig.1. The monostable flip-flop amplitude stabilizer



Card 3/13



COUNTRY : USSR  
 CATEGORY : Cultivated Plants. General Problems. M  
 ABS. JOUR. : RZhBiol., No. 3, 1959, No. 10859  
 AUTHOR : Lavrenko, A. T., Sova, M. S., Oleynik, K. I., Zhumatiy,\*)  
 INST. : Odessa Agricultural Institute.  
 TITLE : Reports on Production Experiments (in a Number of Kolkhozes of Odessa, Zaporozhskaya, Nikolayevskaya, Kirovogradskaya, Zakarpatskaya and Cherkasskaya Oblasts).  
 ORIG. PUB. : Tr. Odessk. s.-kh. in-ta, 1958, 13, 137-145.  
 ABSTRACT : No abstract.

\*) P. I., Kryuk, L. A., Berdnik, I. V., Osak, V. P.,  
 Prokopenko, M. I., Dmitrenko, Ye. A.

CARD: 1/1

GRECHIN, P.Yu.; LAVRENKO, I.V.

Capillary ball pen attached to the PASK-8 potentiometer of the  
AEKS-900 logging station. Sbor.luch.rats.predl. pt. 2:32 '63.  
(MIRA 17:5)

1. Dnepropetrovskaya geofizicheskaya ekspeditsiya.

BAKALYUK, Ya. Kh.; GONCHAREVSKIY, M.S.; LAVRENKO, N.A.

Aluminum coating of steel pipes. *Misl. tekhn.-ekon. inform. Gos.*  
*nauch.-issl. inst. nauch. i tekhn. inform.* 18 no. 12:5-7 D '65  
(MIRA 19:1)

L. 31044-66	ENT(m)/T/EMP(t)/EMP(b)/ENA(c)	IJP(c)	JD/GS
ACC NR: AT5027954	SOURCE CODE: UR/0000/65/000/000/0180/0186		
AUTHOR: Gorbunov, N. S. (Doctor of chemical sciences); Lavrenko, N. A.; Pilipenko, N. L.			
ORG: none	17 Bri		
TITLE: Chromium diffusion coatings on tubes			
SOURCE: Seminar po zharostoykim pokrytiyam. Leningrad, 1964. Zharostoykiye pokrytiya (Heat-resistant coatings); trudy seminar. Leningrad, Izd-vo Nauka, 1965, 180-186			
TOPIC TAGS: steel, carbon steel, steel tube, tube coating, diffusion coating, chromium coating, steel tube diffusion coating, coating property			
ABSTRACT: Experiments have been made to improve technology developed at the All-Union Scientific Research Institute of Pipes (VNITI) for vacuum diffusion coating of carbon-steel tubes with chromium. St. 10 steel tubes 18--25 mm in diameter and 500--3000 mm long with a wall thickness of 1.5--2 mm were packed in chromium powder of 1--2 mm particle size and held at 1100, 1120, and 1150C for 2, 4, 6, or 8 hr in a vacuum of $5 \cdot 10^{-1}$ — $5 \cdot 10^{-6}$ mm Hg. The thickness of the chromized layer increased linearly with increasing exposure time and was 0.085, 0.160, 0.240, and 0.310 mm after exposures of 2, 4, 6, and 8 hr, respectively. With an identical exposure time, the thickness of the coating on 0.10% steel was four times that on 0.20% steel. The chromium concentration decreased from 84.5 to 33.6% as the depth of the chromized			
Card 1/2	UDC: UR/0000/65/000/000/0180/0186		

I 31044-66

ACC NR: AT5027954

layer increased from 5 to 61  $\mu\text{m}$ . The coated tubes 25 x 1.8 mm were cold drawn to 20.5 x 2 mm. No cracking or peeling of the chromized layer was observed. The thickness of the chromized layer increased, compared to the initial thickness, in proportion to the increase in the thickness of the tube wall. The chromized tubes were satisfactorily joined by expansion, thread, and flange joints, and also by gas and electric arc welding. Orig. art. has: 8 figures and 2 tables. [MS]

SUB CODE: 11, 13/ SUBM DATE: 20Jul65/ ORIG REF: 006/ OTH REF: 002/ ATD PRESS:

4178

Cord 2/2 LC

LAVRENKO, P.I., inzhener.

Increasing the productivity of bulldozers. Mekh.stroi. 13 no.2:  
26-28 P '56. (MLRA 9:5)

(Bulldozers)

LAVRENKO, P. I., Cand of Tech Sci -- (diss) "Investigation of the Technological Process of Working ~~MM~~ and Turning the Soil With Bulldozers," Minsk, 1959, 20 pp (Belorussian Polytechnical Institute im I. V. Stalin) (KL, 2-60, 113)

LAVRENKO, P.I.; BLYUM, A.G., red.

[Analytical method for selecting the most efficient ways of  
operating bulldozers] Analiticheskiy metod vybora ratsional'-  
nykh priemov raboty bul'dozerov. Minsk, Redaktsionno-izdatel'-  
skii otdel BPI im. I.V.Stalina, 1959. 53 p. (MIRA 13:3)  
(Bulldozers)



LAVRENKO, P.I.; PATENT, Sh.S.

Using radio communication in construction. *Nekh. stroi.* 18 no.  
5:18-20 My '61. (MIRA 14:7)

1. Trest *Stroymekhanizatsiya*, g. Minsk.  
(Construction industry) (Radio in industry)

LAVRENKO, Pavel Ivanovich, kand. tekhn.nauk, dots.; PATENT,  
Sholom Solomonovich, inzh.; ANTONOVA, N.N., inzh., red.

[Use of radio in dispatcher control] Primenenie radio-  
svlazi v dispetcherskoi sluzhbe; opyt tresta No.15  
"Stroimekhanizatsiya" Ministerstva stroitel'stva  
Belorusskoi SSR. Moskva, Gosstroizdat, 1962. 10 p.  
(MIRA 16:9)

1. Akademiya stroitel'stva i arkhitektury SSSR. Institut  
organizatsii, mekhanizatsii i tekhnicheskoy pomoshchi  
stroitel'stvu. 2. Belorusskiy politekhnicheskii institut  
(for Lavrenko). 3. Glavnyy dispetcher tresta No.15  
"Stroymekhanizatsiya" Ministerstva stroitel'stva Bel.SSR  
(for Patent).

(Radio) (Intercommunication systems)

LAVRENEO, V., inzh. po tekhnike bezopasnosti

Regulate the production of electric detonators. Bezop.truda v prom.  
2 no.10:34 0 '58. (MIRA 11:11)

1. Rudoupravleniye Lengerugol'.  
(Detonators)

LAVRENKO, V.

Eliminate defects of battery lamps. Bezop.truda v prom. 2 no.5:35  
My '58. (MIRA 11:4)

1. Inzhener po tekhnike bezopasnosti rudoupravleniya Lengerugol'  
Yuzhno-Kazakhatanskogo sovnarkhoza.  
(Mine lighting)

5(1,2)  
AUTHORS:

~~Lavrenko, V. A.~~, Barmashenko, I. B.

SOV/153-58-4-13/22

TITLE:

Investigation of the Electrochemical Production of Ammonium Persulfate Using Porous Silver Cathodes Depolarized by Air ( Issledovaniye elektrokhimicheskogo polucheniya persulfata ammoniya s primeneniym poristykh serebryanykh katodov, depolyarizuyemykh vozdukhom)

PERIODICAL:

Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 4, pp 77 - 82 (USSR)

ABSTRACT:

If in the electrolysis dissolved oxygen is present in the electrolyte an improvement of the cathode potential is obtained. The discharge process of the hydrogen ions is substituted by the reduction of oxygen. The electric reduction takes place in several stages which are different for acid and alkaline media. The practical use of this improvement of the cathode potential in the depolarization of the hydrogen separation owing to oxygen as well as the production of hydrogen peroxide met with considerable difficulties. They could be overcome by using porous electrodes with air blowing (Refs 2-7).

Card 1/4

Investigation of the Electrochemical Production of Ammonium Persulfate Using Porous Silver Cathodes Depolarized by Air SOV/153-58-4-13/22

The authors expected a considerable improvement of the potential in connection with the properties of the silver electrode; they also did not exclude that hydrogen peroxide would be formed under the most favorable conditions. In the production process mentioned in the title the values of the cathode potential decrease in the substitution of the usual lead cast cathode by a porous silver cathode with air blowing were determined. The potentials of these electrodes were measured at different current densities but under the same conditions of electrolysis. The experimental method is described and a scheme of the apparatus used is given (Fig 1). The electrolysis was either carried out without diaphragm or with a passing electrolyte. The authors arrived at the following conclusions: 1) In the transition from the lead to the mentioned silver cathodes a considerable improvement of the cathode potential is obtained. 2) The utilization of the current on a silver cathode is higher by about 2% the working voltage in the bath is,

Card 2/4

Investigation of the Electrochemical Production of Ammonium Persulfate Using Porous Silver Cathodes Depolarized by Air SOV/153-53-4-15/22

however, lower by 0,7 - 1,0 V. On the average the current consumption is lower by 7,5%. 3) In electrolysis without diaphragm the specific current consumption increases whereas the concentration of the active oxygen in the electrolyte decreases. 4) In a continuous electrolysis with a passing electrolyte the current consumption per kg of active oxygen decreases. If a metalloceramic silver electrode with air depolarization is used persulfate can be produced with a current consumption of 19-20 kWh per 1 kg of active oxygen. There are 3 figures, 3 tables, and 9 references, 7 of which are Soviet.

ASSOCIATION: Kiyevskiy politekhnicheskii institut (Kiyev Polytechnical Institute) Kafedra tekhnologii elektrokhimicheskikh proizvodstv (Chair of Technology of Electrochemical Enterprises)

Card 3/4

LAVRENKO, V.A.; PRANTSEVICH, I.N.

Investigating the kinetics of high temperature oxidation of tungsten in habitual and deformed states. Vop.por.met.1  
prochn.mat. no.6:42-52 '58. (MIRA 13:4)  
(Tungsten) (Metals at high temperature)



AUTHOR: Lavrenko, V.A. SOV/21-58-10-12/27

TITLE: The Kinetics and Mechanism of the High-Temperature Oxidation of Tantalum in the Recrystallized and Cold-Worked States  
(Kinetika i mekhanizm vysokotemperaturnogo okisleniya tanta-  
la v rekristallizovannom i naklepannom sostoyaniyakh)

PERIODICAL: Dopovidi Akademii nauk Ukrain's'koi RSR, 1958, Nr 10,  
pp 1079 - 1082 (USSR)

ABSTRACT: The author studied the oxidation of tantalum in the air at a temperature range from 600 to 1,000°C for the recrystallized and cold-worked states of the metal. The experiments showed that recrystallized tantalum at 700 to 1,000°C and cold-worked tantalum at 650 to 900°C obey the parabolic law of oxidation rate, whereas recrystallized tantalum at 600 to 650°C and cold-worked tantalum at 600°C obey the cubic law. The author derives equations for the temperature dependence of the product of  $Ta/Ta_2O_5/O_2$  galvanic cell electromotive force by the oxide electroconductivity, for the recrystallized and cold-worked states ( $t = 600$  to  $1,000^\circ C$ ). The general equation of the electrochemical interaction of tantalum with oxygen is as follows:  

$$2Ta + 5 O_{(ads)} \rightarrow 2Ta^{+5} + 2xO_{(in Ta)} + 2xO + (5 - 2x)O'' + 4xe^-.$$

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SOV/21-58-10-12/27

The Kinetics and Mechanism of the High-Temperature Oxidation of Tantalum  
in the Recrystallized and Cold-Worked States

There are 3 graphs and 14 references, 3 of which are Soviet,  
3 German, 2 French, 1 English, 1 American and 4 unidentified.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR  
(Institute of Metalloceramics and Special Alloys of the AS  
UkrSSR)

PRESENTED: By Member of the AS UkrSSR, Yu.K. Delimarskiy

SUBMITTED: May 22, 1958

NOTE: Russian title and Russian names of individuals and institu-  
tions appearing in this article have been used in the trans-  
literation.

1. Tantalum--Oxidation
2. Tantalum--Temperature factors
3. Mathematics

Card 2/2

AUTHOR: Lavrenko, V.A.

SOV/21-58-11-15/28

TITLE: The Kinetics and Mechanisms of High-Temperature Oxidation of Rhenium in the Recrystallized and Cold-Worked States (Kinetika i mekhanizm vysokotemperaturnogo okisleniya reniya v rekristallizovannom i naklepannom sostoyaniyakh)

PERIODICAL: Dopovidi Akademii nauk Ukrain's'koi RSR, 1958, Nr 11, pp 1216-1220 (USSR)

ABSTRACT: This paper is part of the investigation being carried out by the author into the effect of the state of metals on the processes of high-temperature oxidation [Ref 1]. Of special interest among the metals is rhenium which is the only metal possessing strength and plasticity in the annealed state, and a considerable capacity to strengthening at cold deformations. In addition to this, rhenium has a very high temperature of recrystallization. The author calculated the temperature dependence equations of the linear oxidation rate constants for the recrystallized and cold-worked states in the temperature range from 400 to 725°C. The linear law of oxidation rate was first derived in a general form by V.A. Arslambekov [Ref 8]. It was found that the slowest stages of the process were the kinetically inseparable stages of the

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SOV/21-58-11-15/28

The Kinetics and Mechanisms of High-Temperature Oxidation of Rhenium in the Recrystallized and Cold-Worked States

electrochemical formation of rhenium oxides and their subsequent vaporization.

There are 3 graphs, 1 table and 10 references, 3 of which are Soviet, 3 English, 2 American, 1 German and 1 Japanese.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR  
(Institute of Power Metallurgy and Special Alloys of the AS UkrSSR)

PRESENTED: By Member of the AS UkrSSR, Yu.K. Delimarskiy

SUBMITTED: May 22, 1958

NOTE: Russian title and Russian names of individuals and institutions appearing in this article have been used in the transliteration.

Card 2/2

AUTHORS: Mocharnyuk, R. F., Lavrenko, V. A. SOV/6-32-6-42/46

TITLE: On the Method of Determining the Constants of the  
Logarithmic Equation for the Rate of Alloy Oxidation  
(O metodike rascheta konstant logarifmicheskogo zakona  
skorosti okisleniya splavov)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 6, pp.  
1429-1430 (USSR)

ABSTRACT: For the description of the experimental curve showing  
corrosion versus time usually one of the four mentioned  
equations is used; two of them are suited for high  
temperatures and the third is given for low temperatures.  
The fourth equation is rarely used, e. g. on certain  
conditions for iron and zinc and especially for aluminium  
and its alloys. Tamman and Köster (Ref 5) represented the  
logarithmic law of the rate of oxidation by means of an  
equation; the same was done by other authors, however,  
direct calculation of the constants is possible only  
according to the method employed by Champion and Whyte  
(Ref 7), and only this way a sufficient agreement with  
the data of the experiments is obtained. Until now this

Card 1/2

On the Method of Determining the Constants of the SOV/76-32-6-42/46  
Logarithmic Equation for the Rate of Alloy Oxidation

method has, however, not been employed sufficiently. A derivation of the third of the four given equations is carried out; according to this method of calculation the curves showing corrosion versus time in the oxidation of iron-copper (30% Cu) at 300-400°C were analysed. The oxidation was carried out according to the usual method of continuous weighing. The results of the calculation are given. There are 1 figure and 7 references, 0 of which is Soviet.

ASSOCIATION: Akademiya nauk USSR, Institut metallokeramiki spetsstavlavov,  
Kiyev (Kiyev, Institute of Powder Metallurgy of Special  
Alloys, AS Ukr. SSR)

SUBMITTED: September 27, 1957

- |                           |                               |
|---------------------------|-------------------------------|
| 1. Iron alloys--Oxidation | 2. Aluminum alloys--Oxidation |
| 3. Zinc alloys--Oxidation | 4. Mathematics                |

Card 2/2

LAVRENKO, V. A.: Master Chem Sci (diss) -- "The kinetics and mechanism of oxidation of tungsten, molybdenum, tantalum, and rhenium in the recrystallized and cold-hardened states". Kiev, 1959. 12 pp (Min Higher Educ Ukr SSR, Kiev State U in T. G. Shevchenko), 150 copies (KL, No 15, 1959, 114)

LA V R E N K o , V. A.

SOV/3355

PHASE I BOOK EXPLOITATION

Mauchnyy, Soviet po

18(7) Akademiya nauk SSSR. Institut metallurgii. Problemy zharnoprochnykh spлавov

Isledovaniya po zharnoprochnym spлавam, t. IV (Studies on Heat-resistant Alloys, vol. 4). Moscow, Izd-vo AN SSSR, 1959. 400 p.

Kratka naliq inserted, 2,200 copies printed.

Ed. of Publishing House: V. A. Klimov; Tech. Ed.: A. P. Guseva; Editorial Board: I. P. Rardin, Academician; G. V. Kurdyumov, Academician; N. V. Agayev; Corresponding Member, USSR Academy of Sciences; I. K. Odintsov, I. M. Pavlov, and I. P. Zudin, Candidate of Technical Sciences.

PURPOSE: This book is intended for metallurgists concerned with the structural metallurgy of alloys.

COVERAGE: This is a collection of specialized studies of various problems in the structural metallurgy of heat-resistant alloys. Some are concerned with theoretical principles, some with descriptions of new equipment and methods of investigation, and others with properties of specific materials. Various phenomena are described under specified conditions are studied and reported on. For details, see Table of Contents. The articles are accompanied by a number of references, both Soviet and non-Soviet.

301

Pines, B. Ya., and A. P. Sitenko. Investigation of Diffusion-Creep in Ceramics

311

Bal'shin, M. Yu. Some Problems in the Theory of Sintering and Creep

317

Grigor'yeva, V. V., and V. M. Klisenko. Properties of Chromium Carbides and of Ceramics Based on Them

323

Svet, D. Ya. Radiant Emissivity of Metals

329

Frantsovich, I. M., and V. A. Lavumko. High Temperature Oxidation of Tungsten, Molybdenum, Tantalum, and Rhenium in the Recrystallized and Work-hardened States

340

Arsharov, V. I., and B. S. Borlansk. Effect of Alloying Elements on the Grain Resistance of Alloys and on Bond Strength in Grain-phase Lattices in Scale. Effect of Nickel and the Combined Effect of Chrome and Nickel on the Bond Strength in Hematite

Card 10/12

/o



S/137/62/000/005/077/150  
A006/A101

12.1152  
AUTHOR: Lavrenko, V. A.

TITLE: On the thermodynamical calculation of equilibria in the tungsten-oxygen system (in connection with a study of the high-temperature oxidation of tungsten)

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 5, 1962, 17, abstract 5198 (V sb. "Vopr. poroshk. metallurgii i prochnosti materialov", no. 7; Kiyev, AN UkrSSR, 1959, 25-32)

TEXT: The heterogeneous equilibrium of the W-O system was thermochemically, calculated within a range of 600 - 900°C, and the equilibrium constants of oxidizing and oxidizing-reducing reactions were calculated. The author shows that reaction  $2W_2O_5 + O_2 = 4WO_3$  is thermodynamically impossible. The data obtained from the calculations and previous investigations of W oxidation kinetics at high temperatures, are compared with results of a roentgenostructural analysis of W-scale. The results are discussed from the standpoint of existing concepts on the mechanism of W-oxidation. There are 14 references. ✓B

[Abstracter's note: Complete translation]

Z. Rogachevskaya

Card 1/1

80218

S/126/60/009/04/021/033  
E021/E435

18.6100

AUTHORS: Frantsevich, I.N., Shiyanovskaya, I.Ye. and  
Lavrenko, V.A. ✓

TITLE: Cold-working and Recovery of Tungsten and Molybdenum  
of High Purity Under Conditions of an Inhomogeneous  
Stressed State ✓

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 4,  
pp 593-597 (USSR)

ABSTRACT: Compacted cermet materials of high purity were used in  
the investigation. Cylindrical specimens of tungsten  
of a purity 99.989% and a density 19.3 g/cm<sup>3</sup>, and  
molybdenum of a purity of 99.988% and density 10.2 g/cm<sup>3</sup>,  
were subjected to a pressure of 300 kg/mm<sup>2</sup> under a  
100-ton press. Deformation produced was 40% for tungsten  
and 55% for molybdenum. The cold worked specimens were  
heat treated in the range 800 to 1650°C for tungsten  
and 800 to 1200°C for molybdenum for 2 hours in vacuo.  
The temperature of the start of recrystallization was  
determined by Rockwell hardness determinations. A curve  
of H<sub>RC</sub> hardness against temperature is shown in Fig 1  
(for tungsten). A similar curve of H<sub>RA</sub> against ✓

Card 1/2

80218

S/126/60/009/04/021/033  
E021/E435

**Cold-working and Recovery of Tungsten and Molybdenum of High Purity  
Under Conditions of an Inhomogeneous Stressed State**

temperature for molybdenum is shown in Fig 2. The temperatures of recrystallization were 1350°C for tungsten and 1000°C for molybdenum. X-ray analysis of the samples was carried out. By harmonic analysis of the results, it is shown that the broadening of the lines was caused only by microdistortion of the lattice. Fig 4 shows a curve of the recovery of molybdenum by plotting temperature on the abscissa and relative deformation on the ordinate. The curve shows a sharp fall in the microdistortions in the region of recrystallization. Fig 6 shows a similar curve for tungsten. There is a less sharp fall in microdistortions in the region of recrystallization in this case. There are 6 figures and 6 references, 4 of which are Soviet and 2 English.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR  
(Institute of Cermets and Special Alloys AS UkrSSR)

SUBMITTED: June 29, 1959

Card 2/2

85040

18.8300

1530, 1520, 1138 only

S/126/60/010/004/008/023  
E193/E483

AUTHORS: Voytovich, R.F. and Lavrenko, V.A.

TITLE: The Effect of Tantalum<sup>ib</sup> on High Temperature Oxidation  
of Niobium<sup>1</sup>

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.4,  
pp.555-559

TEXT: The kinetics of oxidation of the 17% Nb - 82.5% Ta, 33% Nb - 67% Ta, and 65% Nb - 35% Ta alloys was studied by the gravimetric method. Both recrystallized and plastically deformed (33% reduction in thickness) test pieces (thickness - 0.1 mm, total surface area - 2 cm<sup>2</sup>) were used; the experiments were carried out at 500 to 900°C for periods up to 6 h. The results are reproduced graphically in Figs.1 to 4, where the weight increment per unit area at a given temperature is plotted against the time (h), in Fig.5 showing the temperature dependence of the  $\ln K$  (where  $K$  is the constant of the parabolic law governing the rate of oxidation of the alloys studied) and in Fig.6, showing the concentration dependence of the oxidation characteristics of these alloys. In general, the rate of oxidation of the plastically deformed alloys was higher than that of the recrystallized specimens.

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S/126/60/010/004/008/023  
E193/E483

The Effect of Tantalum on High Temperature Oxidation of Niobium

At temperatures above 700°C the formation of scale was so rapid that the specimens were completely oxidized in less than 2 h. Scale formed at lower temperatures adhered firmly to the unoxidized metal. In the case of the tantalum-rich alloys, some anomalous effects were observed at 900°C. Thus, the weight increment/time curve obtained for these alloys (in the plastically deformed condition) at 900°C was below that obtained at the same temperature for the recrystallized material and below the corresponding curves obtained for both plastically deformed and recrystallized specimens oxidized at 800°C. These effects were attributed to the formation of volatile lower tantalum oxides, mainly TaO; these are more easily formed in the presence of thick scale, since then an oxidation-reduction reaction takes place at the scale/metal interface. The attempts to determine by X-ray diffraction technique the nature of the niobium and tantalum oxides, obtained in the course of the present investigation, were unsuccessful. The process of oxidation of all the alloys studied obeyed the parabolic law in respect to the rate of oxidation, and

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S/126/60/010/004/008/023  
E193/E483

The Effect of Tantalum on High Temperature Oxidation of Niobium

the temperature dependence of  $K$  was given by  
 $K = 0.144 \exp(-11,900/RT)$  for recrystallized, and  
 $K = 0.145 \exp(-10,800/RT)$  for plastically deformed niobium.  
The results obtained indicate that addition of tantalum reduces the  
rate of oxidation of niobium at temperatures below  $800^{\circ}\text{C}$  and  
accelerates it above this temperature. There are 6 figures and  
8 references: 3 Soviet and 5 English.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov  
AN USSR (Institute of Cermets and Special Alloys,  
AS UkrSSR)

SUBMITTED: March 28, 1960

Card 3/3

S/076/61/035/001/014/022  
B004/B060

AUTHOR: Lavrenko, V. A.

TITLE: Anodic electrolytic oxidation of rhenium

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 1, 1961, 198-200

TEXT: The author was concerned with the problem of the dependence of oxidation processes upon the state of the metal. The present paper forms part of the study. The anodic behavior of high purity (99.938%), non-porous, Re in 30%  $H_2SO_4$  was examined (Re was produced by powder metallurgy)

Normal cylindrical Re specimens, recrystallized by annealing at  $1800^{\circ}C$ , and specimens deformed with  $300\text{ kg/mm}^2$ , were used for the purpose. Fig. 1 shows that the potential rise is less sharp with deformed Re than with recrystallized Re. A  $ReO_2$  layer is initially formed in both cases, followed later by higher oxides ( $ReO_3$ ,  $Re_2O_7$ ), which are, however, dissolved in the acid, so that the oxide layer formation is slowed down. At an equal density of the anode current, a temperature rise up to  $20^{\circ}C$  leads to

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Anodic electrolytic oxidation of rhenium

S/076/61/035/001/014/022  
B004/B060

thicker oxide layers, and a further temperature rise leads to the formation of higher oxides and to an accelerated dissolution of the layer, such that at 25°C the rate of layer formation after 3-4 min becomes equal to that of its dissolution. Analytically, the following Re concentration was found in the electrolyte at 28°C: 0.25 g/l for recrystallized Re, and 0.94 g/l for deformed Re. At 40 ma/cm<sup>2</sup> and 25°C the solution contained 0.0083 g/l of Re after 30 min of experimenting time and with a recrystallized anode, while 0.035 g/l was found with a deformed anode. Deformation thus reduces the energetic activation barrier at the metal - oxide interface, increases the number of active reaction centers, and speeds up the formation of cin-der, as well as the dissolution of higher oxides. Mention is made of A. T. Pilipenko and V. A. Obolonchik. There are 3 figures and 7 references: 2 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Akademiya nauk USSR, Institut metallokeramiki i spetsstlavov, Kiyev (Academy of Sciences UkrSSR, Institute of Powder Metallurgy and Special Alloys, Kiyev)

SUBMITTED: February 17, 1959

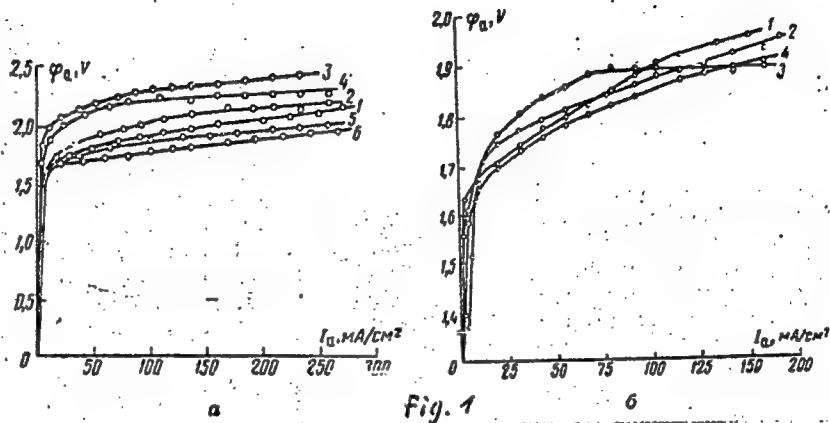
Card 2/3



Anodic electrolytic oxidation of rhenium

S/076/61/035/001/014/022  
B004/B060

Legend to Fig. 1.  
a) recrystallized  
anode; 1: 13°C;  
2: 15°C; 3: 20°C;  
4: 25°C; 5: 28°C;  
6: 40°C; 6) cold  
hardened anode;  
1: 19°C; 2: 22°C;  
3: 28°C; 4: 31°C



Card 3/3

LAVRENKO, V.A.

Kinetics of the anodic electrolytic oxidation of tungsten.  
Zhur. fiz. khim. 35 no.5:1095-1102 My '61. (MIRA 16:7)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.  
(Tungsten) (Oxidation, Electrolytic)

AM4008911

BOOK EXPLOITATION

S

Frantsevich, Ivan Nikitich (Doctor of Chemical Sciences); Voytovich, Raisa Fominichna (Candidate of Chemical Sciences); Lavrenko, Vladimir Alekseyevich (Candidate of Chemical Sciences)

High-temperature oxidation of metals and alloys (Vyssokotemperaturnoye okisleniye metallov i splavov), Kiev, Gostekhizdat USSR, 1963, 321 p. illus., biblio. 1,000 copies printed.

TOPIC TAGS: metal physics, high temperature oxidation, refractory metals, tungsten, molybdenum, tantalum, rhenium, refractory compounds, oxide coating, cermet coating, halogen medium, diffusion, crystal lattice defect, corrosion

PURPOSE AND COVERAGE: The book examines the theory of high-temperature oxidation of metals and alloys from the viewpoint of modern physics of solids and the chemistry of crystal lattice defects. In addition to a critical presentation of the theoretical concepts, the results of experiments by the authors on the kinetics of scale formation on refractory metals and alloys and the first systematic presentation of the oxidation of materials by gases containing sulphur, halogens, corrosion by flash, oxidation of refractory compounds, and anti-corrosion coatings

Card 1/3

AM4008911

are included in the book. The book is intended for employees of research institutes and plant laboratories; it can also be used by engineers in other fields and by students in higher educational institutions.

TABLE OF CONTENTS [abridged]:

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Ch. I. Theory of metal oxidation - - 12

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Ch. IV. Effect of the state of the metal on the oxidation processes of  
refractory metals - - 105

1. Oxidation of tungsten
2. Oxidation of molybdenum
3. Oxidation of tantalum
4. Oxidation of rhenium

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AM1008911

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- Ch. VIII. Oxidation processes of the flash type - - 249
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- Bibliography - - 305

SUB CODE: ML

SUBMITTED: 27 Mar 63

NR REF SOV: 088

OTHER: 451

DATE ACQ: 6 Jan 64

Card 3/3

L 8711-65 ENG(j)/ENT(a)/EPF(c)/EPF(b) Pr-4/Pad/Pa-4 JD/EN/WB  
ACCESSION NR: AP4005839 S/0226/63/000/006/0039/0045

AUTHOR: Lavrenko, V. A.

TITLE: Protective action of aluminum oxide coating on nickel

SOURCE: Poroshkovaya metallurgiya, no. 6, 1963, 39-45

TOPIC TAGS: aluminum oxide, coating, nickel oxidation, oxidation resistance, vacuum vapor deposition, deposition, oxidation prevention, vacuum deposition, vapor deposition, vacuum condensation

ABSTRACT: The author has investigated the protective action of pure aluminum oxide, deposited on nickel by the vacuum vapor method, by comparing the air oxidation of pure Ni and Ni coated with 25-50  $\mu$  of  $Al_2O_3$  at 500-1000C. Scale formation on nickel in air was also studied. A pressed  $Al_2O_3$  tablet was placed in a

tion of pure Ni and Ni coated with  $\text{Al}_2\text{O}_3$ . A pressed  $\text{Al}_2\text{O}_3$  tablet was placed on pure nickel in air was also studied. A vacuum of  $1.33 \times 10^{-3}$  N/m<sup>2</sup>, on a tungsten coil; "Tesla" vacuum vapor unit, under a vacuum of  $1.33 \times 10^{-3}$  N/m<sup>2</sup>, on a tungsten coil; a 27 amp. current passed through the coil for 20 minutes evaporated the  $\text{Al}_2\text{O}_3$  and deposited it uniformly on the nickel sample. The protective action of  $\text{Al}_2\text{O}_3$  is shown in Fig. 1 of the Enclosure. The author also derives an equation for the oxidation rate of pure nickel, showing that the oxidation rate depends on the number of "entrapped" electrons in the lattice defects; the oxidation proceeds according to a parabolic law for pure Ni between 750-1000C and for Ni coated with  $\text{Al}_2\text{O}_3$

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ACCESSION NR: AP4005839

between 800-900C. The protective action of  $Al_2O_3$  coatings on Ni is explained by the difficulty of oxygen penetration to the Ni- $Al_2O_3$  boundary, and resulting retardation of  $O_2$  adsorption at the boundary of the primary NiO film, as well as the increase in NiO scale connected with the growth of cationic vacancies. The oxygen penetrates only through microscopic defects in the coating. Drop tests were also performed to determine the resistance of  $Al_2O_3$  films against oxidation. Pure nickel was oxidized 10-15 seconds after the drop was coated; when using the described method with  $Al_2O_3$ , 120-130 seconds passed, and when there were no pores in the film 4-5 minutes passed before the solution changed color. It is assumed that heat treatment of Ni coated with  $Al_2O_3$  will improve the resistance significantly by closing existing pores and other minute defects. Orig. art. has: 5 figures, 2 tables and 7 equations.

ASSOCIATION: Institut Metallokeramiki i Spetsial'nykh Splavov AN SSSR (Institute of Metalloceramics and Special Alloys)

SUBMITTED: 17Mar63

ENCL: 01

SUB CODE: 101

NO REF SOV: 002

OTHER: 011

Card 2/3

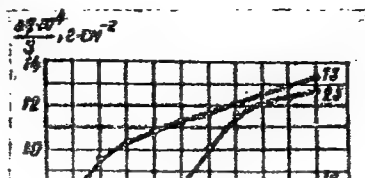


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ACCESSION NR: AT4005839

ENCLOSURE: 01

0



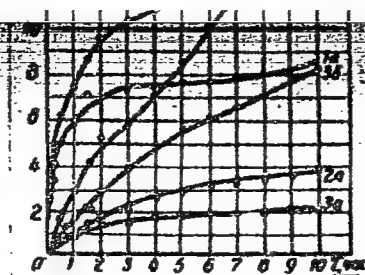


Fig. 1. Oxidation of pure Ni samples (1), nickel coated with 25  $\mu\text{m}$  of  $\text{Al}_2\text{O}_3$  (2), and Ni coated with 50  $\mu\text{m}$  of  $\text{Al}_2\text{O}_3$  (3) at 800C (a) and 900C (b). Ordinate =  $\Delta g \cdot 10^4$  in  $\text{g/cm}^2$ ;

8000 (a) and 9000 (b) Ordinate  $\frac{A}{2} \cdot 10^3$  in g/cm<sup>2</sup>  
 abscisse = time in hours.

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L 9896-63 EWP(q)/EDS/ENT(m)--AFPTG/ASD--JD/JG/WB  
 ACCESSION NR: AP3000414 8/0076/63/037/005/1049/1056

AUTHOR: Lavrenko, V. A.; Pen'kov, A. A.

TITLE: Kinetics of the anodic oxidation of molybdenum in boric acid solution

SOURCE: AN SSSR. Zhurnal fizicheskoy khimii, v. 37, no. 5, 1963, 1049-1056

TOPIC TAGS: anodic oxidation of molybdenum, kinetics of anodic oxidation, rates of electrolytic oxidation, refractory metals, refractory metal electrolytic processes, lattice effects on oxidation, metallic strain in oxidation

ABSTRACT: The present work on molybdenum is part of an investigation to determine the role of the metallic state on electrolytic oxide film formation in refractory metals. The apparatus consisted of an electrolytic cell (applied potentials up to 200V) using 99.987% pure Mo anode plates, a cathode plate of pure Pt separated from the anode by a porous glass diaphragm, and a saturated solution of boric acid as the electrolyte. Two types of samples were studied: cold rolled samples and recrystallized samples annealed in a high-frequency vacuum furnace at 1500C. As a criterion defining the strain, the values (Epsilon)

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ACCESSION NR: AP3000414

of the relative microdeformations formed during rolling, which were estimated from line broadening in X-ray reflection measurements, were used. Analysis of the electrolyte after electrolysis showed a much greater solubility of the Mo oxides from the cold worked sample than from the recrystallized sample. "In conclusion, we take the opportunity to express our gratitude to I. Ye. Shiyanovskaya for taking the X-ray photographs and working out the parts of our investigation dealing with X-rays." Orig. art. has: 17 formulas, and 1 table.

ASSOCIATION: Institut metallokeramiki i spetsial'ny\*kh splavov akademii nauk SSSR (Institute of Metalloceramics and Special Alloys Academy of Sciences SSSR)

SUBMITTED: 21Mar62 DATE ACQ: 19Jun63

ENCL: 00

SUB CODE: 00

NR REF SOV: 00

OTHER: 005

Cord

2/2

FRANTSEVICH, I.N., akademik; LAVRENKO, V.A.

Recombination of hydrogen atoms on the surface of platinum. Dokl.  
AN SSSR 148 no.5:1137-1140 F '63. (MIRA 16:3)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.
2. AN UkrSSR (for Frantsevich).  
(Hydrogen) (Platinum) (Surface chemistry)

LAVRENKO, V.A.; FRANTSEVICH, I.N., akademik

Elementary stages of the process of recombination of hydrogen atoms on an aluminum surface. Activation energy of the reaction. Dokl. AN SSSR 150 no.1:124-127 My '63. (MIRA 16:6)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.
2. AN UkrSSR (for Frantsevich).  
(Hydrogen) (Aluminum catalysts) (Activation energy)

LAVRENKO, V.A.; FRANTSEVICH, I.N., akademik

Elementary stages of the recombination of hydrogen atoms on aluminum surface. Heat of adsorption of atoms, Dokl. AN SSSR 150 no.3:592-595 My '63. (MIRA 16:6)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.
2. AN UkrSSR (for Frantsevich).  
(Hydrogen) (Heat of adsorption)  
(Aluminum catalysts)

LAVRENKO, V.A.; PEN'KOV, A.A.

Kinetics of the anodic oxidation of molybdenum in boric acid solution. Zhur. fiz. khim. 37 no.5:1049-1056 My '63.  
(MIRA 17:1)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.



LAVRENKO, V.A.

Kinetics of the anodic oxidation of tantalum in 30% sulfuric acid.  
Zhur.fiz.khim. 37 no.10:2376-2378 0 '63. (MIRA 17:2)

1. Institut metallokeramiki i spetsial'nykh splavov.

~~L 10531-65~~ ~~EWI(m)/EWP(b)~~ ~~ASD(m)-3/ABDC(a)/ASD(a)-5/AFWL/SSD/BSO/AFETR/~~  
ACCESSION NR: AP4030673 RAEM(t) JD/ S/0129/64/000/004/0050/0051

JG/WB

AUTHOR: Voytovich, R. F.; Lavrenko, V. A.

TITLE: The oxidation of tungsten-rhenium alloys

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 4, 1964,  
50-51

TOPIC TAGS: tungsten rhenium, cermet, cermet tungsten, continuous suspension,  
recrystallization, rhenium cylinder, cation, electric conductivity, oxidation iso-  
therm, sublimation

ABSTRACT: An investigation of the oxidizability of a recrystallized, cold-hard-  
ened tungsten-rhenium alloy involved the use of samples with 5 and 20% rhenium  
content. These were drawn into 0.34 mm-diameter wire and subjected to a 30%.

"APPROVED FOR RELEASE: 06/20/2000

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APPROVED FOR RELEASE: 06/20/2000

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L 10531-65  
ACCESSION NR: AP4030673

2  
temperatures above 700C, there is a considerable increase in the weight of the oxidizable samples because of the formation of a new phase,  $\alpha'$ -WO<sub>3</sub> in the scales with a larger concentration of anionic vacancies in the lattice than  $\alpha$ -WO<sub>3</sub>. A comparison of the resulting data on the oxidation of a tungsten alloy with 5% rhenium with those on the oxidation of pure rhenium at similar temperatures (I. N. Frantsevich and V. A. Lavrenko. "Investigation of heat-resistant alloys" No. 4. SSSR Academy of Sciences) reveals that small additions of rhenium intensify the oxidation. Thus the oxidation rate of an alloy

Vo. 4, SSSR Academy of Sciences) reveals that small additions of rhenium  
simplify the scale-formation process on tungsten. Thus the oxidation rate of an alloy  
at 800C is almost five times as fast as the oxidation of pure (recrystallized)  
tungsten. Large additions of rhenium (20%, for example) are less effective as  
they also accelerate the oxidation rate at temperatures above 700C. Orig, art.  
has: 2 figures.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov Akademii nauk  
Ukr. SSR (Institute Powder Metallurgy and Special Alloys, Academy of Sciences,  
USSR)

SUBMITTED: 00

SUB CODE: IC, MM

NO REF SOV: 005

ENCL: 00

OTHER: 002

Card 2/2

L 25631-65 EWT(m)/EWP(b)/EWA(d)/EWP(z) IJP(c) JD/WB  
ACCESSION NR: AP4044547 S/0073/64/030/008/0788/0792

15  
12  
B

AUTHOR: Lavrenko, V. A.; Chekhovskiy, A. A.

TITLE: Kinetics and mechanism of anodic oxidation of titanium in oxalic acid solution

SOURCE: Ukrainskiy khimicheskiy zhurnal, v. 30, no. 8, 1964, 788-792

TOPIC TAGS: titanium anodic oxidation, oxidation kinetics, oxidation mechanics, oxalic acid solution

ABSTRACT: The kinetics of anodic oxidation of titanium in a saturated solution of oxalic acid was investigated in the range of the anodic current density from 5 to 60 ma/cm<sup>2</sup> at the temperature from 25 to 60C, by the method of the charging and polarization curves. Empirical equations were found which give the dependence of the constant of the rate of change of the potential and oxidation rate of titanium on the anodic current density, and also expressions connecting the oxidation rate and the anodic current with the effective field of film formation. The parameters A+ and B+ were computed which determine the activation barrier.

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ACCESSION NR: AP4044547

oxidation. The mechanism of the anodic oxidation of titanium was considered as due to the semiconductivity of the n-type of the oxide film of  $TiO_2$ . A scheme of the process is suggested which is based on the counter current of diffusing anions toward metal, and the diffusion of the anion holes toward the oxide-electrolyte boundary. Orig. art. has: 6 figures and 7 equations

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR  
(Institute of Metalloceramics and Special Alloys, AN UkrSSR)

SUBMITTED: 06Jun63

ENCL: 00

SUB CODE: GC 447

NR REF SOV: 002

OTHER: 009

Card 2/2

L 25307-65 EWT(m)/EPF(c)/EPF(n)-2/T/EMP(t)/EMP(b) Pr-4/Pn-4 LJP(a) JD/JO

S/0293/65/003/001/0135/0141

ACCESSION NR: AP5005442

AUTHOR: Lavrenko, V. A.; Frantsevich, I. N.

TITLE: Heterogeneous recombination of atomic gases. The interaction of atomic hydrogen with the surface of molybdenum

SOURCE: <sup>27</sup> Kosmicheskiye issledovaniya, v. 3, no. 1, 1965, 135-141

TOPIC TAGS: heat transfer, reentry, aerodynamic heating, atom recombination, hydrogen, molybdenum

ABSTRACT: The recombination of neutral hydrogen atoms on the surface of molybdenum heated to 100—350C was studied at partial H pressures of 0.005—0.05 mm Hg. The heterogeneous recombination of atoms and radicals, formed in a bow shock wave, is important for determining the aerodynamic heating of the frontal part of spacecraft moving at hypersonic speeds, because the recombination rate is a determining factor for the overall heat flux, particularly at higher temperatures. Hydrogen is of interest because of its presence in the geocorona. The hydrogen atoms (10%) generated in a high-voltage discharge tube were passed to a 0.1-mm-diameter Mo wire, which was directly heated by a current. The coefficients of effective collisions were determined microcalorimetrically. Plots were obtained of the recombination rate

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ACCESSION NR: AP5005442

vs temperature, the coefficients of recombination vs temperature, the transmission coefficients vs pressure, and the heats of chemisorption. It was concluded that heterogeneous recombination is a complex phenomenon and that the chemisorption on active catalyst sites, the diffusion of atoms through the frozen surface layer, and the conditions of steady-state heat transfer should be further studied. Orig. art. has: 4 figures and 6 formulas. [PV]

ASSOCIATION: none

SUBMITTED: 17Nov63

NO REF SOV: 002

ENCL: 00

OTHER: 01C

SUB CODE: ME,SV

ATD PRESS: 3184

L 3164-66 EWT(m)/EPF(c)/ETC/EPF(n)-2/ENG(m)/T/EWP(t)/EWP(b) IJP(c)  
DS/JD/JG/WB

ACCESSION NR: AP5014307

UR/0073/65/031/006/0587/0592  
669,293

49  
46  
8

AUTHOR: Lavrenko, V. A.; Chekhovskiy, A. A.

TITLE: Kinetics of anodic oxidation of niobium in oxalic acid solutions

SOURCE: Ukrainskiy khimicheskiy zhurnal, v. 31, no. 6, 1965, 587-592

TOPIC TAGS: niobium, oxidation, corrosion, anode polarization, oxalic acid, reaction rate

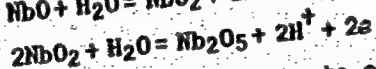
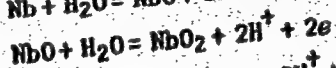
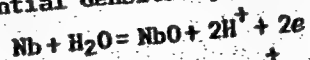
ABSTRACT: The purpose of this study was to investigate the anodic oxidation of niobium at current densities much greater than those investigated previously (1-15 ma/cm<sup>2</sup>) in the temperature range from 20 to 60°C. A saturated solution of oxalic acid was used as electrolyte. Niobium oxides are chemically most inert in this type of electrolyte. The investigations were conducted by charging curves and by polarization curves. Platinum foil was used as an anode, separated from the cathode compartment by a glass frit. The electrolytic cell was thermostatted to  $\pm 0.1^\circ\text{C}$ . Two types of specimens were used: a) recrystallized Nb, annealed at 1800°C in a vacuum furnace for 2 hrs and b) cold worked Nb specimens, deformed to 50% of their

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ACCESSION NR: AP5014307

height on a rolling mill. It was found that deformation of the crystal lattice of Nb produces a large number of active centers for oxidation reaction on the anode surface. It is believed that three consecutive electrode reactions, as witnessed by current density vs potential densities, take place:



Equations were derived which give the constant rate of change in the electrode potential and the specific rate of oxidation of niobium as functions of anode current density. The significant acceleration in the oxidation of niobium in the case of cold worked metal specimens results from lowering of the activation barrier for oxidation as well as from the increase in the effective area of formation of oxide film by almost an order of magnitude. Orig. art. has: 5 figures and 1 table.

ASSOCIATION: Institut problem materialovedeniya AN UkrSSR (Materials Research Institute, AN UkrSSR)

Card 2/3

L 3164-66

ACCESSION NR: AP5014307

SUBMITTED: 03Jan64

NO REF SOV: 002

ENCL: 00

SUB CODE: GC, ME

OTHER: 002

Card 3/3 *md*

DZYUBENKO, G.M.; LAVRENKO, V.A.; NEPOCHATOV, A.N.

Apparatus for studying the kinetics of catalytic reaction of  
recombination of gas atoms on solid surfaces. Zhur.fiz.khim.  
39 no.10:2622-2624 0 165.

(MIRA 18:12)

1. Institut problem materialovedeniya AN UkrSSR.

L 34085-65 EPF(c)/EMP(j)/EMT(m)/EMP(b)/EMA(a)/EMP(t) Fe-h/Pr-h RM/JD

ACCESSION NR: AP5004601

S/0020/65/160/002/0398/0401

25  
24  
B

AUTHOR: Rokhlenko, A. V.; Lavrenko, V. A.

TITLE: Method of determining the degree of atomization of a gas in a stream and the catalytic effectiveness of metal surfaces in atom recombination processes

SOURCE: AN SSSR. Doklady, v. 160, no. 2, 1965, 398-401

TOPIC TAGS: metal catalyst, surface catalysis, catalytic hydrogenation, atom recombination, gas atomization, gas diffusion

ABSTRACT: The authors note that the methods which have been theoretically elaborated for estimating the effectiveness of surfaces in recombination reactions are tied in with experiments which can be carried out in a diffusion tube (the Smith method (W. V. Smith, J. Chem. Phys., 11, No. 3, 110, 1943)). Specifically, H. Wise and C. M. Ablow (J. Chem. Phys., 29, No. 3, 110, 1943) considered, for this case, the diffusion and heterogeneous reaction of labile particles in a cylinder of finite length, while B. M. Wood and A. B. King (J. Chem. Phys., 35, No. 4, 1530, 1961) investigated a situation in which the cylinder of infinite length is replaced by a catalytic probe, and Dickens, Schofield and Walsh (Trans. Farad. Soc., 56, No. 446, 225, 1960) have provided the derivation and numerical solution of a

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three-dimensional diffusion equation. There is further evidence that a consideration of diffusion is essential in experiments conducted in a stream of gas. Attention is called to the fact that a weakness in experimental procedures of this type is the need to determine the degree of atomization of the gas in the stream. This latter circumstance is seen as requiring the introduction of a great deal of complexity into the experimental methodology, and, in some cases at least, the application of radiospectroscopic techniques. The method outlined in the present article makes it possible to determine directly the gas atom recombination factors on the surface of a solid body and, at the same time, the degree of gas atomization in the stream. Correspondingly, the thermal effects of the probes can be determined, for example, in accordance with the method developed by S. Roginsky and A. Schechter (Acta Phys. Chim. URSS, 1, 388, 1934). An axially-symmetrical problem is considered for a cylindrical tube of diameter  $2R$  with an axis which coincides with the  $x$ -axis. The atomic concentration is assumed to be so small that homogeneous recombination can be disregarded and particle absorption occurs only at two sections of the tube where the absorbing probes are located. It is further assumed that the probes do not disturb the moving stream (traveling along the  $x$ -axis at velocity  $v$ ) from the point of view of aerodynamics. Two expressions are derived which represent a system of two algebraic equations with respect to two

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unknown quantities: the recombination factor and the atomic concentration. Generally speaking, this system does not make it possible to obtain a closed solution because of the fact that it contains infinite sums which, it is true, converge rapidly. Through limitation to a finite number of terms, equations can be solved with any degree of accuracy. On the basis of the method described in this article, experiments are reported on hydrogen atom recombination on the surfaces of pure copper at a gas pressure of 0.194 mm of mercury. The results of these experiments are discussed briefly. Orig. art. has: 20 formulas.

ASSOCIATION: Institut problem materialovedeniya Akademii nauk UkrSSR (Materials science problems institute, Academy of sciences, UkrSSR)

SUBMITTED: 06Jul64

ENCL: 00

SUB CODE: GC, ME

NO REF SERV: 005

OTHER: 007

Card 3/3



L 42101-66 EWP(e)/EWT(m)/EWP(w)/EWP(j)/T/EWP(t)/ETI IJP(c) JD/IG/WW/JW/JG/WR/AT/

ACC NR: AP6020924 RM/WH

SOURCE CODE: UR/0369/66/002/002/0241/0243

AUTHOR: Lavrenko, V. A.

ORG: none

234  
123  
B

TITLE: All-Union Seminar on the interaction of high-temperature materials with ambient media

SOURCE: Fiziko-khimicheskaya mekhanika materialov, v. 2, no. 2, 1966, 241-243

TOPIC TAGS: heat resistant material, scientific conference, plasma interaction, boundary layer problem, laminar boundary layer, chemical reaction kinetics, quantum mechanics, creep mechanism, crystal structure, refractory metal, arc discharge, high temperature ceramic material, high temperature strength, high temperature coating

ABSTRACT: The All-Union Scientific Seminar on the interaction of high-temperature materials with ambient media was held 20-26 January 1966 in L'vov.

The seminar was sponsored by the Scientific Council on the problem "The Physicochemical Fundamentals of Designing New Inorganic Heat-Resistant Materials," by the Scientific Council on the problems "Physicochemical Mechanics, Surface Phenomena, and Surface-Active Substances," Academy of Sciences USSR, and by the Scientific Council on the problem "The Physicochemical Mechanics of Materials," Ukrainian Academy of Sciences. About 210 specialists representing 53 organizations presented 55 reports

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ACC NR: AP6020924

on the most diverse problems related to the effect of gaseous and liquid media on the properties of materials used in modern engineering.

The program of the seminar included four basic topics: 1) Heat and mass transfer in materials under the action of a high-velocity gas stream. 2) The effect of various types of radiation on materials. 3) The effect of low-temperature plasma on materials. 4) The interaction between high-temperature materials and molten metals. In his opening statement, I. N. Frantsevich reviewed the most important achievements in the fields of physical chemistry, the science of materials, and the physics of heat and mechanics in the solution of the complex problems of interaction between solids and the various media. In his introduction, G. V. Karpenko informed the participants on the development of the Physicomechanical Institute of the Ukrainian Academy of Sciences.

G. I. Petrov and N. I. Anfimov presented a review of the methods used in calculating the processes of heat and mass transfer in the interaction of materials with a high-velocity gas stream. The authors derived a system of equations describing heat and mass transfer in a gaseous boundary layer, in a solid body, and in the liquid film on a body surface. The effect of various complementary factors, such as the multiplicity of

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ACC NR: AP6020924

components, dissociation, ionization, radiation, absorption, and super-charging with individual gases and gas mixtures through a surface, on the state of the gaseous boundary layer was discussed in detail. The processes of heat and mass transfer within a disintegrating body were analyzed, and the conditions of operation of materials in a high-velocity gas stream and the criteria applied in evaluating the efficiency of materials used for protection of structures and equipment against heat were reviewed.

M. I. Chayevskiy spoke on the embrittling effect of impurities on a strained metal in contact with molten metal and established basic relationships which determine the selectivity of the reaction of liquid metals with strained solid materials.

G. A. Tirskiy reviewed the theory of the laminar boundary layer on the surface of disintegrating plastics. The author described the method of calculation and the mechanism of disintegration of graphite, quartz, and structural plastics, such as textolite, taking into account dissociation and ionization of the air.

Three reports were devoted to the problems of modelling extremely important processes of heterogeneous recombinations of gas atoms in the

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interaction between a flying body and an ambient medium and between gases and catalyst walls. V. A. Lavrenko and G. M. Dzyubenko discussed the kinetics of the reaction of hydrogen atoms with a surface of aluminum oxide at a pressure of 25-80  $\mu\text{m Hg}$ . 41 27 11

A. V. Rokhlenko and V. A. Lavrenko propounded a quantum-mechanical theory of the recombination of gas atoms on the surface of solid bodies, and derived the asymptotic solution for the problem of interaction between two structureless particles on the surface of a solid catalyst.

A. V. Rokhlenko, V. M. Smidovich, and V. A. Lavrenko developed a method of electron paramagnetic resonance for investigation of the recombination gas atoms on the surface of metals which possess strong nonresonant absorption of the energy of a high-frequency field. A. V. Zyrin and V. A. Dubok spoke on the dependence of electrophysical properties of metal oxides on the partial pressure of oxygen at high temperatures.

V. Ya. Kolot, V. F. Rybalko, G. F. Tikhanskiy, and Ya. M. Fogel' reported on an investigation of the corrosion film formed on a beryllium surface in high vacuum, in a hydrogen or oxygen atmosphere. Yu. I. 18 21

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ACC NR: AP6020924

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Kozub discussed the effect of active gaseous media on the mechanical properties of refractory metals at high temperatures.

E. A. Abramyan, L. I. Ivanov, V. Ya. Yanushkevich, and N. S. Kudryavtsev discussed the high-temperature creep of niobium and zirconium, which is an important characteristic determining the behavior of these metals in space. A. N. Kushnirenko used a quantum-field method to determine the energy spectrum of a system of interacting particles, which makes it possible to study the changes in the physical properties of a solid body subjected to external radiation. A. Ye. Glauberman and M. A. Ruvinskiy reported on the theory of exciton formation in crystals during passage of fast electrons.

M. S. Koval'chenko and V. V. Ogorodnikov spoke of the damage to the crystal structure and the changes in physicomechanical properties of titanium and chromium carbides under the action of nuclear (primarily neutron) radiation. R. Basharov, Ye. S. Trekhov and Ye. N. Gavrilovskaya presented the results of microscopic and x-ray diffraction examination of metal surfaces damaged by a concentrated ruby laser beam with a pulse energy of up to 10 joule.

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ACC NR: AP6020924

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V. V. Gogosov discussed the boundary layers in a two-temperature plasma — ionized gas in which light and heavy particles have different temperatures — with special emphasis on the behavior of electron and ion temperatures near a solid surface. He spoke also of a specific boundary wall-adjacent layer which, in the case of fully ionized plasma, is much thinner than the dynamic boundary layer.

G. N. Dul'nev, N. A. Yaryshev, and R. A. Ispiryan reported on some results of an investigation of the heat and mass transfer in solid materials under the action of plasma and light energies. A. K. Musin spoke on the effect of plasma-contacting surfaces (solid or liquid, walls or particles) on the ionized state of the plasma under nonequilibrium conditions.

A. K. Musin and M. A. Tyulina discussed the mechanism of the formation of a double electrical layer in plasma generated between two metal contacts when the circuit is broken. The investigation was based on the concept that thermoelectron emission from the solid, liquid, and gaseous surfaces restricts the plasma.

R. Basharov, Ye. N. Gavrilovskaya, Or A. Malkin, and Ye. S. Trekhov reported on copper cathode destruction in a strong-current discharge with

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the plasma pinch located along the parallel planes of the electrode. R. Basharov and Ye. S. Trekhov described an investigation of the destruction of the working surface of a material struck by gas discharge plasma. L. Yu. Abramovich investigated the mechanism of the formation of the cathode spot on the surface of a negative metal electrode placed in plasma.

G. V. Levchenko, V. S. Potokin, and V. I. Rakhovskiy reported on the interaction between arc-resistant ceramics and the bases of rapidly moving electric arcs (up to 1000 amp). G. V. Levchenko, V. I. Rakhovskiy, O. K. Teodorovich, and I. N. Frantsevich described the erosion of sintered metaloceramic contact points under the action of a high-powered arc. V. V. Kantsel', T. S. Kurakin, V. S. Potokin, and V. I. Rakhovskiy reported on the resistance of refractory metals to the action of an arc discharge in vacuum.

A number of reports dealt with reactions between solids and molten metals. Ye. D. Shchukin discussed the role of interatomic reactions in the adsorption-induced lowering of the strength of materials. V. I. Likhtman, L. S. Bryukhanova, and I. A. Andreyeva established that the surface tension, whose magnitude could vary as a result of adsorption in-

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ACC NR: AP6020924

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interaction between a strained body and the ambient medium, is the most important factor determining the effect of surface-active molten metals on the strength and ductility of solid metals. Yu. V. Naydich and G. A. Kolesnichenko stated that the nature of the bond between a metal and graphite is a basis for evaluating experimental data on the interaction of liquid metals with graphite.

A. L. Burykina and M. T. Yevtushok reported on the development of coatings for protecting graphite articles from mechanical and erosive action of aggressive media. M. A. Maurakh, V. I. Kostikov, I. A. Pen'kov, and G. M. Sverdlov presented experimental data on carburization of liquid refractory metals of the IV, V, and VI groups in contact with a graphite surface. These authors also proposed a theory of isothermal spreading of molten metals of the IV group on graphite, taking into account chemical reactions. Yu. V. Levinskiy, K. I. Portnoy, and S. Ye. Salibekov spoke on the kinetics of the reaction of carbon with borides, carbides and nitrides of metals of the IV-VI groups.

G. A. Yasinskaya described oxygen-free refractory materials stable in molten magnesium, copper, aluminum, silicon, cadmium, zinc, tin, lead, bismuth, manganese, and iron. M. A. Maurakh, V. I. Kostikov,

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ACC NR: AP6020924

V. A. Levin, and B. S. Mitin reported on the reaction of liquid oxides of the  $Al_2O_3$ - $SiO_2$  system with tungsten, molybdenum, and graphite. M. V. Dukarevich, S. I. Kontorovich, and Ye. D. Shchukin discussed the decrease in the strength of fine-pore structures resulting from the adsorption-induced lowering of free surface energy. 7

. The proceedings of the seminar will be published and the second All-Union Seminar will be convened in 1967. [FSB: v. 2, no. 8]

SUB CODE: 11, 20 / SUBM DATE: none

Card 9/9 af

LAVRENKO, V.V. (Leningrad, ul. Lebedeva, 37-a, VMOLA imeni S.M. Kirova, Kafedra gistologii i embriologii).

Experimental study of the development of cancerous epithelium in the wall of the rectum. Arkh. anat., gist. i embr. 44 no.5: 84-95 My '63. (MIRA 17:6)

1. Kafedra gistologii i embriologii (zav.-shlen-korrespondent AMN SSSR prof. S.I. Shchelkunov) Voenno-meditsinskoy ordena Lenina akademii imeni S.M. Kirova, Leningrad.

LAVRENKO, V.V. (Leningrad, 175. Vyborgskaya ul. d.4, kv.5)

Changes in small blood vessels during the posttraumatic regeneration of the skeletal musculature. Arkh. anat. gist. 1 embr. 36 no.5: 55-65 My '59.  
(MIRA 12:7)

1. Kafedra gistologii s embriologiyey (nag.- chlen-korrespondent AMN SSSR prof. S. I. Shchelkunov) Voenno-meditsinskoy ordena Lenina akademii im. S.M. Kirova.

(MUSCLES, blood supply

changes in small vessels in post-traum. regen. of skeletal musc. in dogs (Rus))

LAVRENKO, V.V.

Nucleolo-nuclear ratio in normal and cancerous rectal epithelium.  
Ark. anat., gist. i embr. 47 no.8:53-58 Ag '64.

(MIRA 18:4)

1. Kafedra gistologii i embriologii (zav. - chlen-korrespondent  
AMN SSSR prof. S.I. Shchelkunov) Voenno-meditsinskoy ordena Lenina  
akademii imeni Kirova. Adres avtora: Leningrad, K-9, ul. Lebedeva,  
37-a, Voenno-meditsinskaya akademiya imeni Kirova, kafedra  
gistologii i embriologii.